

Serial No. 10/601,030, Docket No. RA-5482
Examiner Peugh, Group Art Unit 2187

Office Action Response
September 6, 2006

Please amend the Claims as follows:

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- 1 1. (Currently Amended) For use in a system having multiple processors in a
2 processing node coupled to a memory, a method, comprising:
 - 3 a.) receiving multiple requests for data from the multiple processors;
 - 4 b.) if ones of the multiple requests are requesting the same data, creating
5 a respective linked list in the processing node to record the ones of the multiple
6 requests, the linked list being created without regard to types of the requests;
7 and
- 8 c.) issuing one of the requests recorded by each linked list from the
9 processing node to the memory.
- 1 2. (Original) The method of Claim 1, wherein each linked list orders requests in
2 order of receipt, and wherein the issued request is the oldest pending request.
- 1 3. (Original) The method of Claim 1, wherein the memory issues memory
2 requests to the multiple processors for the return of data to the memory, and if a
3 memory request is requesting the same data as requests recorded within a
4 linked list, adding the memory request to the linked list.
- 1 4. (Original) The method of Claim 1, and further including:
 - 2 receiving requested data from the memory;
 - 3 if the received data was requested by requests recorded in a linked list,
 - 4 providing the received data to a processor that issued a predetermined one of
5 the requests included in the linked list;
 - 6 removing the predetermined request from the linked list; and
 - 7 processing all requests remaining in the linked list.
- 1 5. (Original) The method of Claim 4, wherein the predetermined request is the
2 oldest-pending request in the linked list.

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- 1 6. (Original) The method of Claim 4, wherein the processing step includes:
2 making the next request in the linked list the current request;
3 requesting return of the received data from whichever one of the multiple
4 processors last retained the data;
5 providing the received data to whichever one of the multiple processors is
6 indicated by the current request; and
7 removing the current request from the linked list.
- 1 7. (Original) The method of Claim 6, wherein the memory issues memory
2 requests to the multiple processors for the return of data to the memory, wherein
3 a memory request requesting the same data as requests recorded by a linked list
4 is added to the linked list, and wherein the providing step includes providing the
5 received data to the memory if the memory is indicated by the current request.
- 1 8. (Original) The method of Claim 7, wherein a shared cache is coupled to the
2 multiple processors, and further including:
3 attempting to retrieve the received data from the shared cache; and
4 if, in response to the requesting step, none of the multiple processors
5 returns the received data, the providing step includes providing any data
6 retrieved from the shared cache to whichever one of the multiple processors or
7 the memory is indicated by the current request.
- 1 9. (Original) The method of Claim 8, wherein if, in response to the requesting
2 step, none of the multiple processors returns the received data, and if the
3 received data is not resident in the shared cache, indicating the current request
4 must be retried.
- 1 10. (Original) The method of Claim 9, wherein the step of receiving requested
2 data from the memory occurs before all invalidation operations are completed for
3 the received data, and further including preventing predetermined data from

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4 being provided to the memory until predetermined invalidation operations are
5 completed.

1 11. (Original) The method of Claim 6, wherein the requesting and providing steps
2 of Claim 6 are performed during an indivisible operation.

1 12. (Currently Amended) A method of processing requests generated by
2 requesters and provided to a memory, including:

3 a.) receiving a request for data stored in the memory;

4 b.) if the request is requesting the same data as another pending request
5 that has not yet been provided from the requesters to the memory, linking the
6 request to the other pending request without regard to types of the requests and
7 before either of the requests is provided by the requesters to the memory; and
8 c.) repeating steps a.) and b.) for any additional requests issued to the
9 memory.

1 13. (Original) The method of Claim 12, wherein steps a.) through .c) include
2 creating multiple linked lists of requests, each respectively associated with
3 different data.

1 14. (Previously Amended) The method of Claim 13, and further including:

2 d.) when data for the pending request is received from the memory,
3 providing the data to a requester that issued the pending request; and

4 e.) if the pending request is linked to any other request, requesting that
5 the data be returned by a requester indicated by the pending request so that the
6 any other linked request may be processed.

1 15. (Original) The method of Claim 14, and further including:

2 f.) providing the data to satisfy the linked request.

1 16. (Original) The method of Claim 15, and further including:

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- 2 g.) making the linked request the current request;
3 h.) if the current request is linked to a request, requesting that the data be
4 returned by a requester that most recently retained the data;
5 i.) providing returned data to satisfy the linked request; and
6 j.) repeating steps g.) through i.) for any additional requests in the linked
7 list.

- 1 17. (Original) The method of Claim 16, wherein at least one of steps e.) and h.)
2 include requesting that the data is returned with predetermined access rights that
3 are based on a type of the current request and the linked request.
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- 1 18. (Original) The method of Claim 16, wherein at least one of steps e.) and h.)
2 include requesting that the data is returned with predetermined access rights
3 based on rights that were granted by the memory for the data.

- 1 19. (Original) The method of Claim 16, wherein at least one of steps e.) and h.) is
2 performed in a manner that is determined programmably.

- 1 20. (Currently Amended) A system for processing requests to a memory,
2 comprising:
3 multiple requesters ~~in a processing node~~ to issue requests for data;
4 a request tracking circuit ~~in the processing node~~ to retain a record of each
5 request until the request is completed, and to associate a request with any other
6 one or more requests for the same data irrespective of types of the requests so
7 that a single request from the multiple requesters for any given data is pending
8 within the memory at a given time.

- 1 21. (Original) The system of Claim 20, wherein the request tracking circuit
2 includes a storage device to store multiple requests for the same data in a
3 respective linked list of requests.

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1 22. (Original) The system of Claim 21, wherein the request tracking circuit
2 includes a control circuit to receive data from the memory, and to provide the
3 received data to one of the multiple requesters based on information stored
4 within the storage device.

1 23. (Original) The system of Claim 22, wherein if the received data is received in
2 response to a request that has been associated with other requests, the control
3 circuit provides the received data to whichever requester issued the oldest one of
4 the associated requests, and processes each of the other associated requests in
5 the order in which the other associated requests were recorded by the request
6 tracking circuit.

1 24. (Previously Amended) The system of Claim 23, wherein the control circuit
2 includes circuits to process each of the other associated requests by attempting
3 to obtain the received data from one of the multiple requesters, then providing
4 any obtained data to a requester that is identified by the request that is being
5 processed.

1 25. (Original) The system of Claim 24, wherein the control circuit includes a
2 circuit to cause a requester to reissue a request if, during processing of a
3 request, data requested by the request could not be obtained.

1 26. (Original) The system of Claim 24, wherein the request tracking circuit
2 includes a remote tracker circuit to store a record of a request received from the
3 memory that is requesting that same data as one or more requests recorded
4 within the request tracking circuit.

1 27. (Original) The system of Claim 25, wherein the control circuit includes a
2 circuit to process the request from memory by attempting to obtain the requested
3 data, then providing any obtained data to the memory.

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1 28. (Original) The system of Claim 23, wherein the memory provides data to the
2 request tracking circuit before all invalidation operations for the data have been
3 completed, and wherein the request tracking circuit includes a circuit to prevent
4 predetermined data retained by predetermined ones of the multiple requesters
5 from being returned to the memory before all of the invalidation operations are
6 completed.

1 29. (Currently Amended) A data processing system comprising:
2 a memory;

3 a processing node coupled to the memory and having one or more
4 requesters to generate requests for data to the memory, wherein the processing
5 node includes a requesting tracking circuit to ~~record, in time-order,~~ associate
6 requests issued for the same data irrespective of request types, and to allow only
7 one of the requests for the same data from being issued to the memory at a
8 given time.

1 30. (Original) The system of Claim 29, wherein the processing node includes
2 multiple processors, and wherein the requesting tracking circuit includes a control
3 circuit to receive data returned from the memory, the control circuit to provide the
4 data to the processor associated with the oldest request pending for the data.

1 31. (Original) The system of Claim 30, wherein the control circuit includes a
2 circuit to determine whether other requests are pending for the received data,
3 and for each of the other pending requests, attempting to obtain the data from
4 whichever of the multiple processors last retained the data, then providing any
5 obtained data to a processor that is associated with the request being processed.

1 32. (Original) The system of Claim 31, wherein the control circuit processes the
2 multiple requests for the received data in an order in which the multiple requests
3 were received.

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1 33. (Original) The system of Claim 32, wherein the request tracking circuit
2 includes a control store to store programmable data to indicate the manner in
3 which the data is to be obtained from a processor based on access rights
4 retained by the processor for the data and the access rights requested by the
5 processor associated with the request being processed.

1 34. (Currently Amended) A system for processing requests to a memory,
2 including:
3 processing means for originating the requests to the memory; and
4 request tracking means for receiving the requests, and for forming an
5 association between any of the requests that are requesting the same data
6 irrespective of types of the requests, and for allowing only one of the associated
7 requests to be provided from the processing means to the memory.

1 35. (Original) The system of Claim 34, wherein the association records an order
2 of receipt of the requests that are requesting the same data.

1 36. (Original) The system of Claim 35, wherein the request tracking means
2 includes control means for receiving data from the memory, and if the received
3 data was requested by associated requests that are requesting the same data,
4 for processing each of the associated requests in the order in which the requests
5 were received.

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- 1 37. (Original) The system of Claim 36, wherein the control means includes means
 - 2 for processing each request by obtaining the data with access rights required to
 - 3 process the request, then providing the data to the processing means with the
 - 4 required access rights.
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